REMARKS

Claims 1-3 and 5-15 are all the claims pending in the application. This Amendment amends claims 1-3 and 6 , adds claims 11-15, cancels claims 4, and addresses each point of rejection raised by the Examiner. Favorable reconsideration is respectfully requested.

Applicants thanks the Examiner for acknowledging the claim for foreign priority under 35 U.S.C. § 119, noting that the priority documents have been received, and indicating that the drawings are accepted.

Applicants call the Examiner's attention to the Information Disclosure Statement filed June 20, 2000. Applicants respectfully request an initialed copy of the Form PTO-1449 to confirm that the Examiner has considered the listed documents.

REJECTION - 35 U.S.C. § 112

Claims 6-10 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the examiner indicates there is insufficient antecedence for "the highest rank circulator" in claim 6. Applicants amend claim 6. Reconsideration is requested.

REJECTION - 35 U.S.C. § 102(b)

Claims 1 and 4-5 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S.P. 6,041,152 to Clark ("Clark").

Clark describes a system with an aggregate output (or input, but not both) and internal components (light sources, circulators, Bragg gratings). Multiport optical circulators are used to combine or separate groups of channels for transmission over a single fiber.

In comparison, in a preferred implementation of the present invention, the system has an aggregate input, an aggregate output and internal components. The system is based on a quite different topology than Clark, and its aim is not limited to source multiplexing, but also allows signal propagation through the device.

To emphasize this difference in topology, Applicants have amended claim 1. Among other things, a transmission signal, to be amplified by an amplifier fiber, propagates through the system in a direction opposite to the pumping signals, such that the topology of the system is now more fully described. An output is added to the claim, from which the transmission signal exits. Also, the subject matter of claim 4 has been incorporated into claim 1, and claim 4 is cancelled.

In view of the amendments to claim 1, reconsideration of claims 1 and 5 is requested.

REJECTION - 35 U.S.C. § 103(a)

Claims 2-3 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Clark.

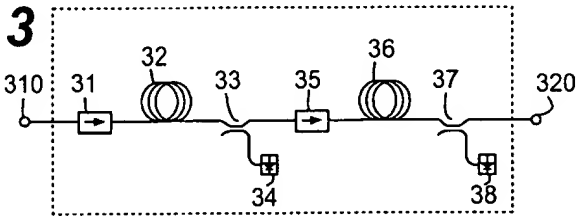
Applicants have amended claims 2 and 3 to describe the topology in more detail, and for consistency with claim 1. Applicants request reconsideration of claims 2 and 3 in view of the amendments to claim 1. Specifically, while Clark discloses wavelength division multiplexing and demultiplexing, Clark does not suggest the inline topology of the claimed invention, whereby the pump signals propagate in one direction and a transmission signal propagates in the other. Even if the wavelengths utilized with Clark were pump wavelengths, the topology of Clark, in view of the other prior art, suggests coupling the combine pump wavelengths with a

transmission signal using a coupler, thereby incurring insertion losses that the present invention minimizes.

Claims 6-7 and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Clark in view of U.S.P. 6,288,810 to Grasso et al. ("Grasso").

In figure 3, Grasso presents a multi-stages Raman amplifier, each stage being amplified by a dedicated single pump multiplexed with the signal through a WDM coupler.

FIG. 3



A first amplification stage comprises an active fiber 32, pumped counterdirectionally by a pumping source 34 through a dichroic coupler. A second amplification stage comprises an active fiber 36 pumped counterdirectionally by a pumping source 38 though a dichroic coupler 37. An amplifier input 310 is connected through a first optical isolator 31, a second optical isolator 35 is connected between the output of the first stage and an input of active fiber 36 of the second stage, with an eventual output 320. *See* Grasso column 6, lines 32-52. Active optical fibers 32 and 36 are preferably erbium-doped silica optical fibers. *See* column 6, lines 65-67. Notably, pumps 34 and 38 have a same emission wavelength of $\lambda_p = 980$ nm. *See* column 7, lines 25-26.

Although Grasso uses optical circulators elsewhere in the disclosure (*e.g.*, Fig. 1), there is no suggestion of the configuration taught in the present application. However, assuming that someone would wish to combine Clark and Grasso so as to couple a plurality of pump wavelengths into an amplifying fiber, the obvious result would be to replace a pump (34, 38)

with the configuration illustrated in Figure 5 of Clark. In other words, couple the multiplexer configuration of Clark to one of the dichroic couplers in Grasso. Thus, a distinction with the present invention is the coupling of the circulators inline with transmitted data, as compared to coupling the pumps to a fiber carrying data via a coupler.

Multiplying pump wavelengths in this manner would lead to Kerfoot invention, and the wavelength selective multiplexer still remains. For example, consider Figs. 4 and 6 of Kerfoot, (further discussed below with regard to claim 9):

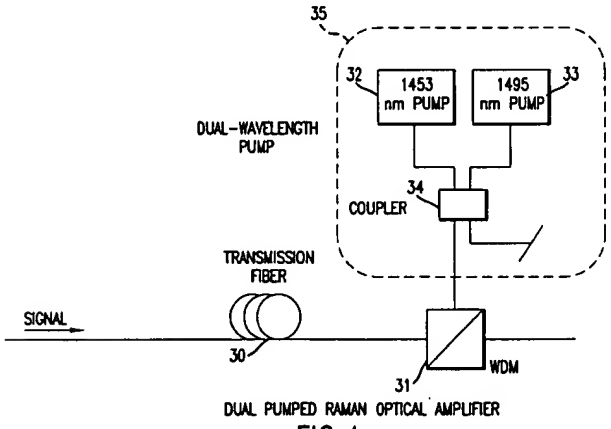


FIG.4

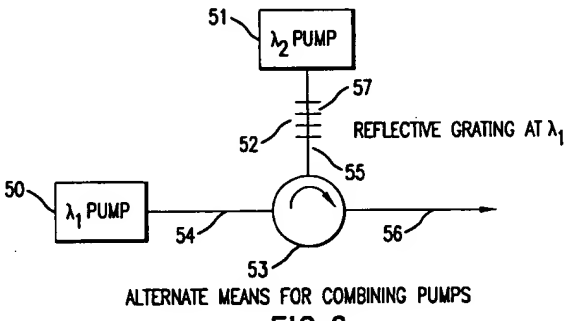


FIG.6

Referring to Kerfoot Fig. 6, a plurality of pump (50, 51) wavelengths are coupled to Raman amplifier via an optical coupler (31) illustrated in Fig. 4. Thus, Applicant submits that the combination of Clark and Grasso does not suggest topology of the claimed invention. Reconsideration is requested.

Claim 8 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Clark in view of Grasso and further in view of U.S.P. 5,652,675 to Shibuya or over U.S.P. 5,812,712 to Pan.

Grasso presents a multi-stage Raman amplifier, each stage being amplified by a dedicated single pump multiplexed with the signal through a WDM coupler. Multiplying pump wavelengths in Grasso utilizing the teachings of Clark would lead to Kerfoot invention and the wavelength selective multiplexer still remains.

Pan reduces amplified spontaneous emission (ASE) of a light source. The device described by Pan comprises (*e.g.*, Figure 1A) a light source (10), a circulator (12) and a grating (14). The grating is centered at the light source wavelength.

Shibuya deals with bi-directional lumped amplifiers. Our invention applies to uni-directional distributed or lumped amplifiers. The basic principle of Shibuya is different is different than that of the claimed invention. For example, the signal and pump are co-propagating in Shibuya invention, whereas they are counter-propagating in claimed invention.

Applicants submit that the combination of Clark, Grasso, Shibuya, and/or Pan do not suggest the topology of the amended claims. Reconsideration is requested.

Claim 9 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Clark in view of Grasso and further in view of U.S.P. 6,320,884 to Kerfoot, III *et al.* ("Kerfoot").

As noted above, in Figure 4, Kerfoot describes a system based on a coupler (34) to aggregate the pumps and a WDM component (31) to multiplex the pump aggregate with the signal. Figure 6 Kerfoot presents an alternative way to aggregate the pumps (in replacement of 34) similar to Clark. In comparison to the seamless amplification bandwidth provided by the claimed topology, this WDM component (31) is wavelength selective, and increases insertion loss.

Applicants submit that the combination of Clark, Grasso, and/or Kerfoot do not suggest the topology of the amended claims. Reconsideration is requested.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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